

# PATENT ABSTRACTS OF JAPAN

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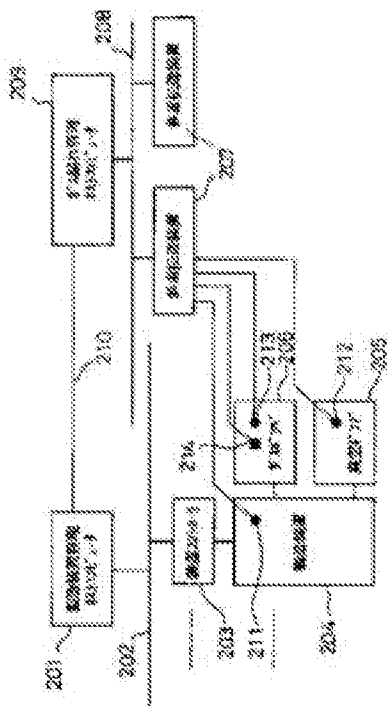
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(71)Applicant : **TOSHIBA CORP**  
**TOSHIBA MICRO**  
**ELECTRON KK**

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(72)Inventor : **SONOBE HIRONORI**  
**YOSHIDA YASUHISA**  
**MATSUZAWA HIROSHI**  
**CHIBA ERIKO**

## (54) PRODUCTION SYSTEM FOR SEMICONDUCTOR DEVICE



(57)Abstract:

**PURPOSE:** To enable controlling a processing equipment based on gas leakage information.

**CONSTITUTION:** A system to detect a gas leakage consists of a semiconductor element processing equipment 204 provided with a gas cylinder 206; gas sensors 211 and 213 installed on the processing equipment 204 and the gas cylinder 206; and a gas valve shut-down device installed on the gas cylinder 206. The gas sensors 211 and 213 and the gas valve shut-down device 214 are connected. Two computers are also provided. A gas leakage control computer 209 drives the gas valve shut-down device 214; and the other computer 201, connected to the gas leakage control computer 209 and the processing equipment 204, controls the processing equipment 204 according to gas leakage information from the gas leakage control computer 209.

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## CLAIMS

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[Claim(s)]

[Claim 1] A gas sensor allocated in a manufacturing installation, and said gas bomb and said manufacturing installation of a semiconductor device which is attached in a gas bomb, It is connected to a gas valve interrupting device formed in said gas bomb, and said gas sensor and said gas valve interrupting device, and detect gas leakage, and. A gas leakage management computer which drives said gas valve interrupting device, A production system of a semiconductor device possessing a manufacturing installation management computer which is connected to said gas leakage management computer and said manufacturing installation, and manages said manufacturing installation based on gas leakage information from said gas leakage management computer.

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[Translation done.]

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the production system of the semiconductor device which contributes to improvement in safety.

[0002]

[Description of the Prior Art] Conventionally, the production system of this kind of semiconductor device is described with reference to drawing 2.

[0003] Namely, the manufacturing installation 104 of the semiconductor device which is provided with the vacuum pump 105, the gas bomb 106, etc. as attached structure and by which poisonous gas and combustible gas are used in the clean room which adopted air conditioning of the circle method in order that this production system might be sealed and might control generating of dust, and mixing of an impurity, The equipment controller 103 connected to this manufacturing installation 104 by communication of the SECS standard is allocated, and this equipment controller 103 is connected to the manufacturing installation management host computer 101 via LAN102. And the manufacturing installation 104, the vacuum pump 105, and the gas bomb 106 are equipped with the gas sensor 108,109,110 which detects the gas leakage of poisonous gas or combustible gas for every type of gas, These gas sensors 108,109,110 are connected to the gas leakage directions alarm equipment 107 with the valve interrupting device 111 formed in the gas bomb 106.

[0004] The product name of the wafer by which the equipment controller 103 is processed in the production system of this composition, The lot No, the wafer No, etc. are read and the processing recipe applicable to the wafer which transmits the data to the host computer 101, uses the sent data as a key, and is processed by the host computer 101 is searched. Then, the searched processing recipe is downloaded to the equipment controller 103, and processing of a wafer is performed by the manufacturing installation 104 based on the downloaded processing recipe.

[0005] By the way, during wafer processing, if gas leakage occurs with the gas bomb 106, gas leakage will be detected by the gas sensor 110, and generating of gas leakage will be displayed by the directions alarm equipment 107. And in order to drive the valve interrupting device 111 by the logic of the directions alarm equipment 107 and to prevent a break through of gas, the gas valve (graphic display abbreviated \*\*) of the gas bomb 106 is closed. The

manual isolating switch (graphic display abbreviated \*\*) was provided in the directions alarm equipment 107 in this case, and interception of the gas valve was also performed by a worker's judgment.

[0006]

[Problem to be solved by the invention]However, in the conventional production system mentioned above, Since the processing did not get across to the manufacturing installation management host computer 101 when gas valve interception processing is performed at the time of gas leakage, the host computer 101 had the problem of the manufacturing installation 104 of taking for it being unusual.

[0007]Since the information on gas leakage did not get across to the manufacturing installation 104, the manufacturing installation 104 continued processing, even if distributed gas stopped, or it shifted from it to the extraordinary processing by the shortage of distributed gas, and there was a problem that suitable processing to the wafer under processing was not performed.

[0008]Since logic (relation between a gas sensitive detector and valve interception) was constituted by the relay etc., the gas leakage directions alarm equipment 107 had the problem that the logic change by the configuration change of the manufacturing installation 104 or attachment took great time and effort.

[0009]When gas leakage occurs in the manufacturing installation 104, since the gas bomb 106 which gas leakage generated is unknown, perform valve interception processing to the gas bomb 106 of an applicable whole zone and clean room further again, and. Even the gas bomb 106 of the zone in which a relation is not at the time of minor gas leakage had the problem of intercepting a valve. The purpose of this invention provides the production system of the semiconductor device which a manufacturing installation can manage based on gas leakage information in view of the problem mentioned above.

[0010]

[Means for solving problem]This invention is characterized by comprising:

A manufacturing installation of the semiconductor device which is attached in a gas bomb in order to attain the purpose mentioned above.

The gas sensor allocated in said gas bomb and said manufacturing installation.

A gas valve interrupting device formed in said gas bomb.

It is connected to said gas sensor and said gas valve interrupting device, and detect gas leakage, and. The gas leakage management computer which drives said gas valve interrupting device, and the manufacturing installation management computer which is connected to said gas leakage management computer and said manufacturing installation, and manages said manufacturing installation based on the gas leakage information from said gas leakage management computer.

[0011]

[Function]Since the gas leakage management computer to which the gas sensor and the gas valve interrupting device were connected was connected to the manufacturing installation management computer in this invention, All the data of each gas sensor is incorporated into a gas leakage management computer, and interception of the gas valve of the gas bomb of gas leakage generating origin can carry out promptly and automatically based on the logic (correspondence of a gas bomb and a manufacturing installation, a type of gas, etc.) of each gas system saved as data.

[0012].By the manufacturing installation and distributed gas stop which gas leakage generated with the gas leakage management computer. The stop which does not have the safety of the manufacturing installation by the directions from a manufacturing installation management computer and the influence on manufacture is attained by transmitting the

information on the influenced manufacturing installation to a manufacturing installation management computer.

[0013]Since the data of correspondence with a manufacturing installation and a gas bomb etc. is manageable on a gas leakage management computer, the logic change by the configuration change of a manufacturing installation or attachment becomes easy.

[0014]

[Working example]Hereafter, one working example concerning the production system of the semiconductor device of this invention is described based on drawing 1.

[0015]That is, in this production system, the manufacturing installation 204 of a semiconductor device which has the vacuum pump 205 and the gas bomb 206 as attached structure, and the equipment controller 203 connected to this manufacturing installation 204 by communication of the SECS standard are installed in the sealed clean room. And the manufacturing installation 204, the vacuum pump 205, and the gas bomb 206 are equipped with the gas sensor 211,212 for gas leakage detection, and the gas bomb 206 is equipped with the gas sensor 213 and the valve interrupting device 214.

[0016]Each gas sensor 211,212,213 and the valve interrupting device 214 are connected to the asynchronous transfer mode device 207 installed for every certain areas, such as a room. This asynchronous transfer mode device 207 is connected to the gas leakage management host computer 209 via LAN208 for gas monitoring, and the equipment controller 203 is connected to the manufacturing installation management host computer 201 via LAN202 for manufacturing control. The manufacturing installation management host computer 201 and the gas leakage management host computer 209 are connected by the communication line 210.

[0017]Next, operation of this production system is described.

[0018]First, the equipment controller 203 reads a product name of a processing wafer, the lot No, the wafer No, etc., and transmits the data to the manufacturing installation management host computer 201 via LAN202 for manufacturing control. The manufacturing installation management host computer 201 downloads a searched processing recipe to the equipment controller 203, after searching a processing recipe which uses sent data as a key and corresponds to the wafer. And the manufacturing installation 204 processes a wafer based on a downloaded processing recipe. At this time, the manufacturing installation management host computer 201 monitors the manufacturing installation 204 and the attached structure 205,206 continuously, and control facilities, such as a report to an operator and stop instruction of the manufacturing installation 204, also have it at the time of an abnormal occurrence.

[0019]Here, when gas leakage occurs from the gas bomb 206, after a signal (gas concentration) of the gas sensor 211,212,213 is changed into a digital signal by the asynchronous transfer mode device 207, it is multiplexed and is transmitted to the gas leakage management host computer 209 via LAN208 for gas monitoring. The gas leakage management host computer 209 converts sent data into gas concentration, and when it is more than an alarm level to which this gas concentration was set beforehand, it judges it to be gas leakage. If gas leakage is judged, the gas leakage management host computer 209 will transmit a cutoff signal to the valve interrupting device 214 of the gas bomb 206 which gas leakage generated via the asynchronous transfer mode device 207, will shut a valve (graphic display abbreviated \*\*) of the gas bomb 206, and will stop a break through of gas.

[0020]Refer to the conversion table of the gas sensor shown in the following provided in the manufacturing installation 204 and the gas bomb 206 for the gas leakage management host computer 209, [Table 1]

		製造装置設置のガスセンサ					
		センサNo 51 ガス種 H <sub>2</sub> アラームレベル 10ppm 装置No 1	センサNo 52 ガス種 cl系 アラームレベル 10ppm 装置No 1	センサNo 53 ガス種 H <sub>2</sub> アラームレベル 10ppm 装置No 2		センサNo 99 ガス種 H <sub>2</sub> アラームレベル 5ppm 装置No 20	
ボンベ ストッカ 設置の ガスセンサ	センサNo 1 ガス種 H <sub>2</sub> アラームレベル 10ppm ボンベストッカNo 1	○		○		○	
	センサNo 2 ガス種 H <sub>2</sub> アラームレベル 10ppm ボンベストッカNo 2			○			
	センサNo 3 ガス種 Hcl アラームレベル 5 ppm ボンベストッカNo 3		○				
	センサNo 4 ガス種 Ccl <sub>4</sub> アラームレベル 10ppm ボンベストッカNo 4		○				
	センサNo 30 ガス種 H <sub>2</sub> アラームレベル 10ppm ボンベストッカNo 30					○	

The manufacturing installation 204 which has received supply of gas from the intercepted gas bomb 206 is selected, and the device name (equipment ID) and a supply interruption gas name (gas ID) are transmitted to the manufacturing installation management host computer 201 using the communication line 210. Then, the manufacturing installation management host computer 201 checks the present situation about the manufacturing installation 204 influenced by gas cutoff. Namely, stop the processing start of the wafer which will be due to be processed next if it is under processing with sheet process equipment (graphic display abbreviated \*\*) now, and the manufacturing installation 204 is stopped. In the case of the manufacturing installation 204 of a processor limited, a next processing assignment is removed, and although it is under processing, when the present processing recipe is not using supply interruption gas, the optimal method of making the minimum damage to safety and a product, such as carrying out processing continuation as it is, is directed to the manufacturing installation 204.

[0021]When gas leakage occurs in the manufacturing installation 204, similarly, with

reference to an upper table, the gas leakage management host computer 209 drives the valve interrupting device 214 of the supplying agency gas bomb 206 automatically, and stops supply of leakage gas. Simultaneously, the gas leakage management host computer 209 transmits the device name (equipment ID) influenced by the device name (equipment ID), the leakage gas name (gas ID), supply interruption gas name (gas ID), and gas stop which gas leakage generated to the manufacturing installation management host computer 201. The manufacturing installation management host computer 201 carries out the scram of the manufacturing installation 204 which gas leakage generated, and is processed like the case of the gas leakage from the gas bomb 206 to the manufacturing installation 204 influenced by other distributed gas stops. The gas leakage management host computer 209 also has functions, such as abnormality display light lighting and emergency evacuation broadcast. [0022]

[Effect of the Invention]As explained above, according to this invention, can carry out the valve interception only of the gas bomb of gas leakage generating origin promptly and automatically, and. It can stop so that the manufacturing installation influenced by the manufacturing installation and distributed gas stop which gas leakage generated may not have the influence on safety and manufacture, and it can be [ at the time of gas leakage ] human, and material damage can be reduced.

[0023]Change of the logic by the configuration change of a manufacturing installation or attachment can be performed easily.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a block diagram of the production system of this invention.

[Drawing 2]It is a block diagram of the conventional production system.

[Explanations of letters or numerals]

201 Manufacturing installation management host computer

202 LAN for manufacturing control

203 Equipment controller

204 Manufacturing installation

205 Vacuum pump

206 Gas bomb

207 Asynchronous transfer mode device

208 LAN for gas monitoring

209 Gas leakage management host computer

210 Communication line

211,212,213 Gas sensor

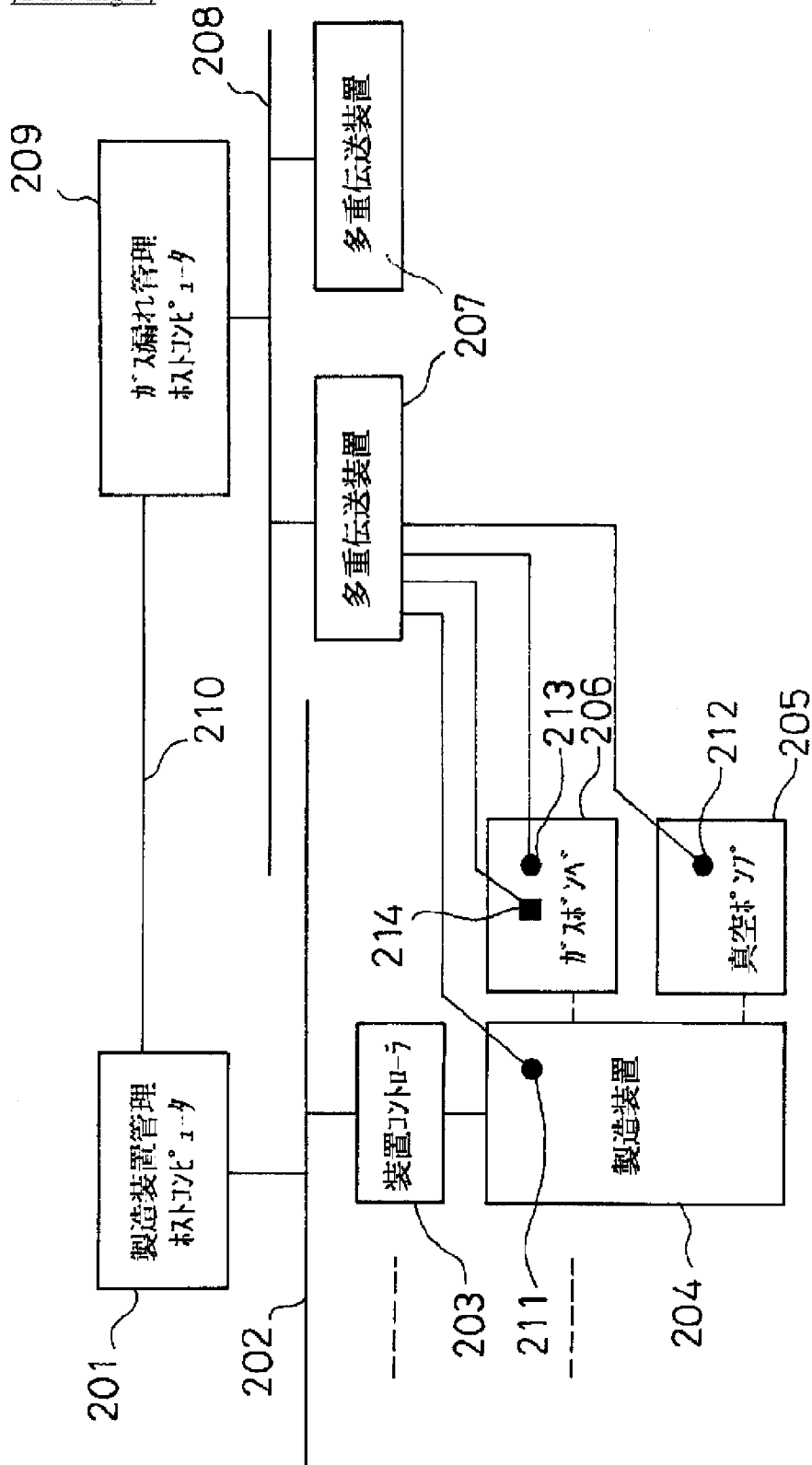
214 Valve interrupting device

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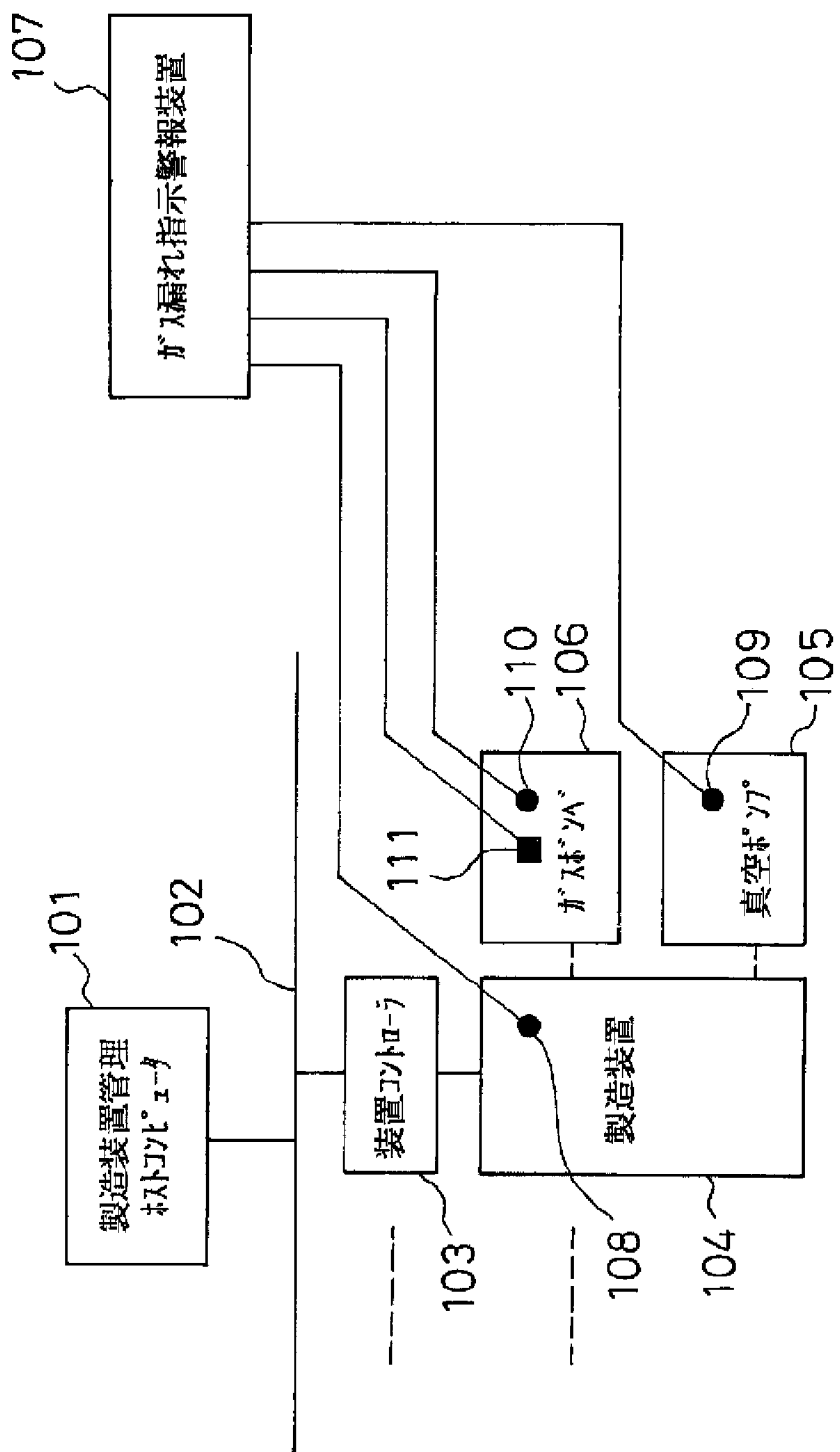
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# DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]